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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/783,179	02/12/2001	Robert Pulford JR.	226-133	6009
21091	7590	10/06/2003	EXAMINER	
JOHN H CROZIER 1934 HUNTINGTON TURNPIKE TRUMBULL, CT 06611			JONES, JUDSON	
			ART UNIT	PAPER NUMBER
			2834	

DATE MAILED: 10/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/783,179	PULFORD, ROBERT	
	Examiner	Art Unit	
	Judson H Jones	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 January 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12, 14-16 and 23-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 24 and 34-42 is/are allowed.
- 6) ☐ Claim(s) 1-12, 14-16, 23 and 26-33 is/are rejected.
- 7) ☒ Claim(s) 25 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

The indicated allowability of claims 2 and 6 is withdrawn in view of the newly discovered reference(s) to Nanba et al. 5,796,186 A. Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 8-10, 12, 14 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Nanba et al. Nanba et al. discloses in figures 2A and 3A an annular movable member 26 with an axially extending, cylindrical, permanent magnet shaft 24 having a smooth external surface with alternating N and S poles 28 wherein the shaft is formed from one homogeneous piece of material with a hollow portion inside the shaft as described in column 4 lines 21-43. In the embodiment shown in figures 2A and 3A, the permanent magnet shaft is the fixed member (i.e., the stator). However in column 9 lines 28-36 Nanba et al. explains that the stator may encircle the movable member and that the stator may have coils. Changing the device of figures 2A and 3A into an outside stator having coils would produce an annular stator structure 26 with an axially extending shaft being the movable member and the shaft extending through the stator.

In regard to claim 8, the linear stepping motor of Nanba et al. can rotate in any direction because there is no locking mechanism to hold the motor in position.

In regard to claim 9, see Nanba column 4 lines 18-20.

In regard to claim 10, the linear stepping motor of Nanba et al. can operate in any orientation. Since the coil member is circular and is held in place relative to the shaft by bearings 34, the power of the motor will not be affected by the orientation of the device.

In regard to claim 12, see Nanba et al. column 3 lines 55-58.

In regard to claim 14, the Nanba et al. device has no lead screw or ball screw.

In regard to claim 16, there is no conversion of rotary to linear motion in the Nanba et al. device.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nanba et al. in view of Bolding et al. 5,831,353 A. Nanba et al. discloses the linear stepping motor but does not disclose modular stator stacks. Bolding et al. teaches modular stator pieces in the abstract. Since Bolding et al. and Nanba et al. are from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized stator modules in a linear motor device in order to make the motor devices more efficient by matching the size of the motor to the load.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nanba et al. in view of Yakota et al. 6,116,257 A. Nanba et al. discloses the linear stepping motor but does not disclose a stepper motor that requires no lubrication. Yakota et al. teaches in column 17 line 56 to column 18 line 9 that solid lubricating components can be added to materials and plated on bearing sections. Since Yakota et al. and Nanba et al. are from the same field of endeavor it

would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized solid lubricating components in plating material for the a linear stepping device in order to avoid having to maintain the motor by periodically adding lubrication.

Claims 23, 26-28, 30, 31 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nanba et al. in view of Daniels. Nanba et al. discloses in figures 2A and 3A an annular movable member 26 with an axially extending, cylindrical, permanent magnet shaft 24 having a smooth external surface with alternating N and S poles 28 wherein the shaft is formed from one homogeneous piece of material with a hollow portion inside the shaft as described in column 4 lines 21 to line 43. However in column 9 lines 28-36 Nanba et al. explains that the stator may encircle the movable member and that the stator may have coils. Nanba et al. does not disclose a solid core of non-magnetic material for the permanent magnet shaft. According to Nanba et al. column 4 lines 54-56, "If there is no ferromagnetic core inside the stator 24, the magnetic flux inside a cavity at the center is dispersed and the magnetic flux density becomes lower." Daniels teaches that long hollow shafts are subject to vibration in column 4 lines 43-46 and teaches filling such shafts with chemical foam or other plastic material to provide vibration damping. Since Daniels and Nanba et al. are from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized chemical foam or other plastic material in the hollow shaft of a linear motor for preventing vibration and thus improving the precision and response of the motor.

In regard to claim 26, the linear stepping motor of Nanba et al. can rotate in any direction because there is no locking mechanism to hold the motor in position.

In regard to claim 27, see Nanba et al. column 3 lines 55-58.

In regard to claim 28, the linear stepping motor of Nanba et al. can operate in any orientation. Since the coil member is circular and is held in place relative to the shaft by bearings 34, the power of the motor will not be affected by the orientation of the device.

In regard to claim 30, see Nanba et al. column 3 lines 55-58.

In regard to claim 31, the Nanba et al. device has no lead screw or ball screw.

In regard to claim 33, there is no conversion of rotary to linear motion in the Nanba et al. device.

Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nanba et al. as modified by Daniels as applied to claim 23 and further in view of Bolding et al. 5,831,353 A. Nanba et al. as modified by Daniels discloses the linear stepping motor but does not disclose modular stator stacks. Bolding et al. teaches modular stator pieces in the abstract. Since Bolding et al. and Nanba et al. as modified by Daniels are from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized stator modules in a linear motor device in order to make the motor device more efficient by matching the size of the motor to the load.

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nanba et al. as modified by Daniels as applied to claim 23 and further in view of Yakota et al. 6,116,257 A. Nanba et al. as modified by Daniels discloses the linear stepping motor but does not disclose a stepper motor that requires no lubrication. Yakota et al. teaches in column 17 line 56 to column 18 line 9 that solid lubricating components can be added to materials and plated on bearing sections. Since Yakota et al. and Nanba et al. as modified by Daniels are from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill

in the art to have utilized solid lubricating components in plating material for the a linear stepping device in order to avoid periodically adding lubrication to the motor.

Allowable Subject Matter

Claim 25 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 24 and 34-42 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:
The prior art of record does not disclose or teach utilizing annular disks of a high lubricity material spacing apart elements of a stator structure and serving as bearing surfaces for an axially extending shaft as recited in claims 24 and 25.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Laronze teaches in figure 17 and in column 5 lines 3-17 that annular rings of a high lubricity material can be placed between elements of a stator structure to serve as bearing surfaces. However rings are not equivalent to annular disks.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Judson H Jones whose telephone number is 703-308-0115. The examiner can normally be reached on 8-4:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 703-308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3431 for regular communications and 703-305-3432 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

JHJ

September 16, 2003

KARL TAMAI
PRIMARY EXAMINER